2755
13
1

OREGON FLORA
Newsletter

VOLUME 13, NUMBER 1 OREGON STATE UNIVERSITY FEBRUARY 2007

ESTHE MERTZ
LIB RY
APR 1 2007
NEW ORK
GARDEN

21st century plant identification

by Aaron Liston & Richard Halse

Every year, new plants are discovered in Oregon. These are not "new species" unknown to science, but rather species that are well known somewhere else in the world, but have never been found growing in this state. Although occasionally new native plants are discovered in Oregon, most of the additions to the state flora are introduced species, native to other parts of the world. One such plant was found by Richard Halse last year in late September. It was growing on the gravel road shoulder of State Highway 42 northeast of Camas Valley in Douglas County. The plants formed a couple of small patches and were obviously in the Apiaceae (Umbelliferae – Carrot Family). However, when it came time to try and put a name on this little annual the difficulties encountered were more than expected. All of the local floras were tried – *Flora of the Pacific Northwest* and the *Jepson Manual* as well as *A Manual of the Higher Plants of Oregon*. The search then continued using floras of eastern North America – with no success. The search then moved to European floras – again with no luck. Eventually, floras from around the world were also consulted, only resulting in more frustration.

In such cases, the problematic plant is usually sent to the taxonomic expert for the family. In the case of the Apiaceae, that person is Dr. Stephen R. Downie, a professor at the University of Illinois at Urbana-Champaign. Dr. Downie is a molecular systematist, and over the past 15 years he and his students and collaborators have published DNA sequences from over 2000 species of Apiaceae, representing many genera and over 2/3 of the species of the family. A large number of these sequences are from one small and variable part of the plant genome, the nuclear ribosomal DNA internal transcribed spacer (ITS) region, and are easily accessible from the public DNA database, GenBank.

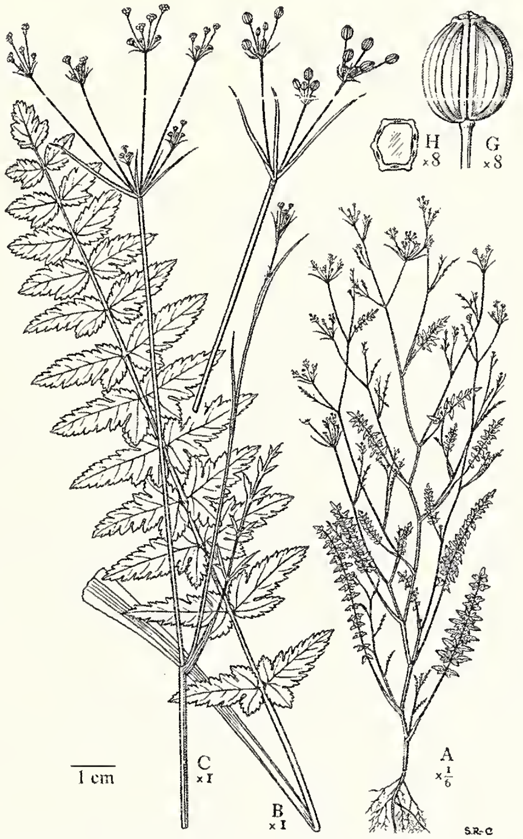
With this comprehensive database, Dr. Downie assumed that it would be "straightforward" to match the DNA of the Oregon unknown to one of the published sequences. His student Clark Danderson readily obtained ITS sequences from fruits and leaves that we provided. Quoting from Dr. Downie, here is what happened next:

"As expected, the sequences from both fruits and leaves matched perfectly. However, these sequences did not match anything available in GenBank! After some effort, I eventually matched it to some unpublished data I have — and your plant matches perfectly with sequence I have for *Petroselinum segetum*! Many years ago I obtained a small specimen of *P. segetum* from France, provided to me from Dr. Jean-Pierre Reduron, an Apiaceae specialist. He wanted me to look at this species because it does not ally with other *Petroselinum* species (e.g., *P. crispum*, parsley) and might be a new genus."

Petroselinum segetum (L.) Koch, or "corn caraway," is a weed of arable land and hedgerows in northwestern Europe. In fact, it is considered a declining species in Great Britain, where modern agricultural practices have greatly reduced its native habitat. It does not seem to be a very "successful" weed, and this is apparently the first report of corn caraway outside of its native range. Unlike many Apiaceae, the plant has neither ornamental nor culinary attraction, and thus it is not a plant that is grown in gardens. How it came to a roadside in Douglas County, Oregon is a mystery that may never be solved.

With a name in hand, we returned to check the venerable

See 21st Century, page 2



Corn caraway, Petroselinum segetum *(L.) Koch. Drawing by Stella Ross-Craig,* Drawings of British Plants, *George Bell & Sons, London, 1958. The publisher went out of business in 1989, and Ms. Ross-Craig died last year at the age of 100. Before her death she received the coveted Kew Award for her artistic work.*

see pl. 3,4

21st Century, continued from front page

Flora Europaea. It turns out that *Petroselinum segetum* cannot be identified using the family key. This species has white to lavender flowers, while the genus can only be reached via the "yellow flowers" lead. There are only two European species in the genus *Petroselinum* – this plant and the commonly cultivated parsley – *Petroselinum crispum*, which does have yellow flowers. Once the plant was identified as a *Petroselinum*, it keyed out easily to *P. segetum* based on flower color.

The identification of organisms based on their DNA sequences has recently attracted considerable attention, and several international efforts are underway to pursue this goal. These methods are known as "DNA barcoding," and the above example illustrates the power of this approach. DNA barcoding is not without controversy. Some are concerned that it will lead to a decline in traditional taxonomy, while others believe it will lead to increased global interest in cataloging and preserving biodiversity. The method is also unproven in the many plant genera with polyploid, apomictic, and hybrid species. These species are difficult to delimit with traditional and experimental approaches, and DNA barcoding will not be a panacea. To learn more about DNA barcoding, visit *www.barcodinglife.org.*

Dr. Richard Halse is the curator of the OSU Herbarium, and Dr. Aaron Liston is the director of the OSU Herbarium. They thank Dr. Stephen Downie and Clark Danderson for the DNA sequence-based identification, and Dr. Downie for comments on the manuscript.

Erythronium oregonum logo and masthead designed by Tanya Harvey.

The Oregon Flora Newsletter is published three times a year by the Oregon Flora Project and the Oregon State University Herbarium. The Editor is Rhoda Love and the Production Assistant is Rena Schlachter.

Oregon Flora Project Coordinator:
Linda Hardison

Checklist Project Leaders:
Kenton Chambers, Richard Halse, Jimmy Kagan, Aaron Liston, Rhoda Love, Robert Meinke, David Wagner, and Peter Zika.

Checklist Advisory Board:
Ed Alverson, Karen Antell, Henrietta Chambers, John Christy, Tom Kaye, Susan Kephart, Frank Lang, Don Mansfield, Kareen Sturgeon, and Barbara Wilson.

Atlas Project Leaders:
Wilbur Bluhm, Robert Frenkel, Clay Gautier, Manuela Huso, Tom Kaye, Jon Kimerling, Aaron Liston, Bruce Newhouse, Charlene Simpson, Dick Straw, Peter Zika, and Don Zobel.

NPSO State Atlas Coordinator:
Wilbur Bluhm

Atlas Project Regional Coordinators:
Bruce Barnes, Lucile Housley, Jerry Igo, Caroline Lindstedt, Andy Robinson, Charlene Simpson, Veva Stansell, and Belinda Vos.

Address correspondence to:
Linda Hardison
Department of Botany & Plant Pathology
Oregon State University, Cordley Hall 2082
Corvallis, OR 97331-2902
E-mail: hardisol@science.oregonstate.edu
(541) 737-4338; FAX (541) 737-3573
http://www.oregonflora.org

Printed on Recycled Paper

New data for the Plant Atlas

by Linda Hardison

Our online Oregon Plant Atlas mapping program (*www.oregonflora.org/oregonplantatlas.html*) has proved to be an extremely popular resource for those of you seeking up-to-date information about plant distributions in Oregon. One of the features of the Atlas that greatly enhances its value is our ability periodically to edit and add new information to its database. Our free online maps were originally made public in March 2005, and were based on approximately 385,000 records from herbarium specimens and observations. This March we will be adding 93,743 new records to the Atlas database! This influx of plant distribution information is based on our ongoing taxonomic research, coupled with a focused effort to obtain new data from herbaria other than those housed at Oregon State University. Thanks to the helpful involvement of many people, we are updating our information from several regional and national herbaria, and introducing significant new datasets from the University of Washington, Portland State University, and the Carex Working Group.

Katie Mitchell, one of the Oregon Flora Project's two database managers, oversees the Atlas. Her work includes logging, verifying, and correcting errors reported by Atlas users as well as preparing new datasets for inclusion in the database. The format of data we receive varies widely—from handwritten species lists by individuals, to extensive herbarium collections databases. Whatever its source or format, the dataset always requires careful review to make it compatible with our own records. This can involve adding information inferred from the data given, such as designating a county or assigning latitude-longitude coordinates that will make the record mappable. Some records may require further investigation, for example, to confirm the scientific name that was applied. The level of quality control for incoming Atlas data is impressive, and makes the Atlas a peerless resource for information on Oregon plant distributions.

Another role our Plant Atlas plays is that of a taxonomic guide to accepted scientific names. Naturally, all components of the Oregon Flora Project will reflect the nomenclature established within our soon-to-be-released *Vascular Plant Checklist*. However, in order to avoid a delay in the release of the Atlas, this version will use the taxonomic names that are currently under review by the eighteen members of the Checklist Advisory Committee. At the completion of the review process, the Checklist will be prepared for online publication on the Oregon Flora Project website and integrated into a second Atlas update, anticipated for later this year. Readers should watch for on-line Oregon Flora Project maps with many new data points, and be prepared to encounter some new plant names!

Rare Plant Guide now online

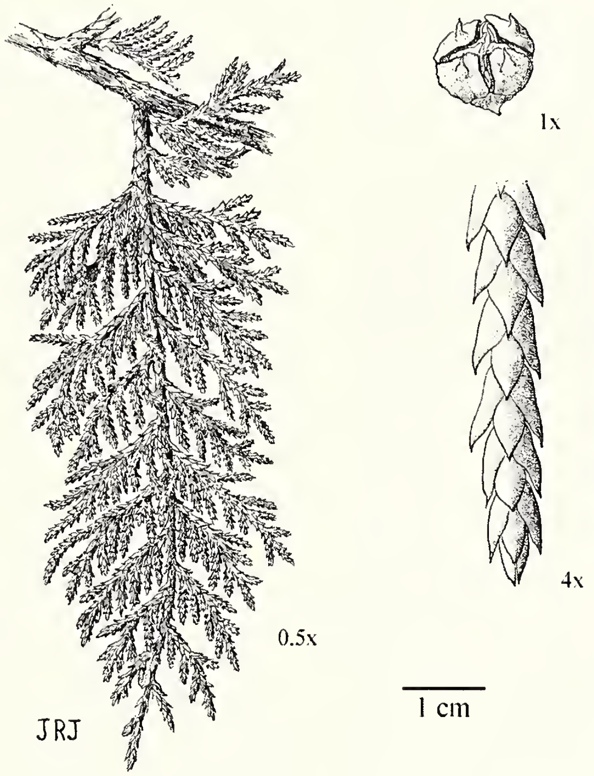
Readers who have explored our website this winter may have discovered our searchable Rare Plant Guide. This site (*www.oregonflora.org/rareplants/*) provides information on 110 of Oregon's rare, threatened, and endangered plants. The OFP began creating fact sheets about rare plants in 2002, with the financial assistance of Willamette Industries, Inc. The two-sided, color pages were designed to aid field botanists in the determination of appropriate habitat and the correct identification of rare

See Rare Plant Guide, *page 4*

Generic concepts and conflicts in the Cypress Family

by Kenton L. Chambers

One would think that the scientific names of all our common forest trees would be so well established by now, that they would be immune from change at the "whim" of taxonomists. However, be assured that plant classification is no longer done by whim. Instead it is based on hard data produced by modern research technology; and when DNA analysis and computer algorithms are utilized to the full, beware of what can happen to those Latin names you thought you knew so well.



Foliage and cone of Callitropsis nootkatensis *(formerly* Chamaecyparis nootkatensis*). Illustration by Jeanne R. Janish, from* Vascular Plants of the Pacific Northwest, *courtesy of* University of Washington Press.

If you learned the scientific name of Alaska Yellow Cedar as *Chamaecyparis nootkatensis*, you are in for a surprise. Perhaps you were already surprised, as I was, to look up this well known Northwest tree in *The Jepson Manual* for California flora (Hickman 1993) and find it classified there as a species of *Cupressus* (along with its congener, Port Orford Cedar). But that is not the end of it. Several recently published research papers, based on combined DNA phylogeny and cladistic analysis of morphology, report that neither of these trees belongs in *Cupressus*, nor do the two of them even belong together in the same genus. As a further shock, we learn that the 16 Western American species of *Cupressus* don't belong in *Cupressus* either! Let me try briefly to make sense of this complicated story.

It begins with the discovery early in this century of a rare forest tree in Vietnam, which in 2002 was assigned the name *Xanthocyparis vietnamensis*. When compared in detail with other members of the Cupressaceae (Cypress Family), this new tree's closest relationship was found to be with Alaska Yellow Cedar—separated by thousands of miles and on the opposite side of the Pacific Ocean. Nonetheless, the two species were so similar that the authors, working in Kew, England, combined them generically, and Yellow Cedar became *Xanthocyparis nootkatensis* (Farjon *et al.* 2002). Port Orford Cedar, on the other hand, resembles other members of *Chamaecyparis* in both morphology and DNA, so it remains in that genus as *C. lawsoniana*.

Soon, more researchers were attracted to the question of evolutionary relationships in Cupressaceae, and an increased number of species were sampled with the same combination of morphological, chemical, and molecular data. When these were fed into computer-based cladistic analyses, new results were immediate. Little *et al.* (2004) pointed out that Alaska Yellow Cedar is the only *Chamaecyparis* species that forms spontaneous, fertile hybrids with *Cupressus* species when these are grown together in botanical gardens. The evidence from DNA and morphology is that it and the Vietnam species are closely related phylogenetically to a group of New World species of *Cupressus*. The Old World species of *Cupressus*, however, are a separate evolutionary line, as is the large genus *Juniperus*. True *Chamaecyparis* species are only distantly related to the cluster of genera that combines Old World *Cupressus*, *Juniperus*, *Xanthocyparis*, and New World *Cupressus*.

In an even more thorough follow-up study, Little (2006) proved that Alaska Yellow Cedar and its Vietnam relative should be classified in the same genus with New World *Cupressus*, but that the correct generic name for this group is *Callitropsis*. The name *Cupressus* technically goes only with the Old World species of the genus. *Juniperus* is more closely related to Old World *Cupressus* than to *Callitropsis*, and it keeps its traditional name.

Callitropsis nootkatensis (D. Don) Florin was first given this unfamiliar generic name in 1864, long predating *Xanthocyparis*. Thus, although the name *Callitropsis* was overlooked for so many years, it must become the correct name for whatever genus Alaska Yellow Cedar is assigned to. As Little (2006) discovered, this genus also contains the 16 New World species formerly placed in *Cupressus*, and he proposes new names in *Callitropsis* for all of these. The species affected are mostly in California, Arizona, and Mexico, with only one, *Callitropsis bakeri* (Jeps.) D. P. Little, ranging to southwestern Oregon. The former "intergeneric hybrid" *Cupressocyparis* X *leylandii*, much cultivated in botanical gardens, becomes an intrageneric hybrid, *Callitropsis* X *leylandii*. I mentioned above that this is a fertile hybrid of Alaska Yellow Cedar with various "*Cupressus*" species.

In this brief note I can't do full justice to Damon Little's study, which incorporated 88 morphological and wood-chemistry characteristics in 56 species of Cupressaceae, combined with sequence analysis of three chloroplast genes and two nuclear genes. I believe that he has clearly identified what taxonomic problems are raised by this new knowledge of the evolutionary history of the *Cupressus* group. His decision to reinstate the old genus *Callitropsis*, rather than join it, *Juniperus*, and all of *Cupressus* into one inclusive genus, causes the least disruption to present taxonomy. The past error of lumping Old World and New World "*Cupressus*" into one genus, based on morphology, was probably due to their parallel evolution of traits adapted to growth in warm, dry climates and azonal soil microhabitats. *Callitropsis nootkatensis* and *C. vietnamensis*, growing in moist forests and cooler climates, represent the other extreme of habitat adaptation in the genus.

See Cypress, *page 4*

Cypress, *continued from page 3*

In broader molecular studies of this family and its relatives, the commonly recognized Taxodiaceae, or Bald-cypress Family, does not show as a unified phylogenetic entity (Gadek *et al.* 2000). Rather, small groups of taxodiaceous genera appear in the analysis as separate lines of evolution (clades) attached to the larger family Cupressaceae. If the families are merged taxonomically, the name Cupressaceae is used, and clusters of related genera—such as *Sequoia*, *Sequoiadendron*, and *Metasequoia*—appear as clades within this enlarged family. The history of this group of conifers must be very ancient, extending back to the early Mesozoic era (Age of Dinosaurs) or before, giving time enough for them to have diversified and dispersed throughout the world.

References:

Farjon, A. *et al.* 2002. A new genus and species in the Cupressaceae (Coniferales) from northern Vietnam, *Xanthocyparis vietnamensis*. *Novon* 12: 179-189.

Gadek, P. A. *et al.* 2000. Relationships within Cupressaceae sensu lato: a combined morphological and molecular approach. *American Journal of Botany* 87: 1044-1057.

Hickman, J. C. 1993. *The Jepson Manual. Higher Plants of California*. Univ. of California Press, Berkeley.

Little, D. P. *et al.* 2004. The circumscription and phylogenetic relationships of *Callitropsis* and the newly described genus *Xanthocyparis* (Cupressaceae). *American Journal of Botany* 91: 1872-1881.

Little, D. P. 2006. Evolution and circumscription of the true cypresses (Cupressaceae: *Cupressus*). *Systematic Botany* 31: 461-480.

Rare Plant Guide, *continued from page 2*

plants from Western Oregon. Each fact sheet includes images of the living plant, an illustration, and a herbarium specimen; a distribution map; a detailed description of the taxon and its habitat; and a list of similar-looking plants with characteristics that distinguish them from the rare species. Additional sheets detailing plants throughout Oregon were created in 2004 and 2006 with funding from the Oregon Watershed Enhancement Board and the US Forest Service Region 6.

We are happy to make these fact sheets accessible to a greater number of people by posting them on our website. They can be viewed and printed from a pdf file. Additionally, we have enhanced the usefulness of the fact sheets by presenting the data in a searchable format. There are also direct links to each taxon within the Oregon Plant Atlas, displaying a "live" map and the data associated with each dot.

The Rare Plant Guide's fact sheets are an excellent example of the scope of information that the Oregon Flora Project is collecting on every native or naturalized species, subspecies, and variety of plant in Oregon. The features presented in the fact sheets—images, maps, and descriptions—represent all facets of the Flora Project. As we continuously develop the science behind the Oregon Flora Project, we are also developing the software tools that enable users to access and combine information from these different aspects in ways that are meaningful to a wide audience. We hope you enjoy using the Rare Plant Guide, and view it as one of the exciting features made possible by your financial support.

Louvera Horn Raymond (1908-2005): a lifelong love of botany

by Linda Hardison

We are always pleased to receive gifts to the Oregon Flora Project in honor or in memory of individuals. It is a fitting tribute to those who value the aims of our project: appreciating and learning about Oregon plants, and building connections between science and citizenry. A generous gift was recently donated in memory of Louvera Horn Raymond by two of her children, Geraldine Custer and Torrance Raymond.

Louvera was born in Kansas on July 10, 1908. When she was a young teenager, she and her family moved to Oregon. Louvera graduated from Salem High School, and went on to earn a teaching certificate from the Oregon Normal School (now Western Oregon University). In 1931 she transferred to Oregon State College (Oregon State University), hoping to study science. However, course offerings and degree majors available to females at that time were limited. The following year, the botany major was opened to women, and Louvera happily filled her schedule with science and botany courses. Louvera Horn graduated from OSC in 1933. She married Louis Raymond in 1934, and eventually the couple settled in Chappaqua New York. Although Louvera never worked as a paid botanist, plants always held an important role in her life. She was a devoted gardener and president of the Chappaqua Garden Club. She also used her teaching skills to share her botanical knowledge through workshops and programs for both adults and children. As a widow, Louvera moved back to Oregon, where she fed her love of plants through container gardening at her retirement home in McMinnville. She passed away October 26, 2005 at the age of ninety-seven.

As someone who was equally enthralled by botanical classification as by the aesthetic beauty of plants, Louvera would have appreciated the work of the Oregon Flora Project, her daughter Geraldine Custer recently said. The Oregon Flora Project is honored to have been chosen to help celebrate the memory of Louvera Horn Raymond and her lifelong love of botany.

Louvera Horn (Raymond). Photo from Oregon State College yearbook, The Beaver, *1933.*

2006-2007 Challenge Drive:
many thanks for your support !

Our last newsletter informed readers of our 2006-2007 Challenge Drive, which offered $25,000 in matching funds for the Oregon Flora Project if an equal amount were contributed. Thanks to the generosity of 214 donors, the challenge amount was met—and surpassed! Donations of $27,119, in combination with the matching funds, have brought $52,119 to the Oregon Flora Project!

Of those who participated in this fundraiser, nine households contributed more than once. The average contribution was $122, and seventy-five of the 223 donations were of this amount or higher. Many have been longtime supporters: 184 donors to this challenge drive have given to the Oregon Flora Project more than once, and 36 have contributed ten times or more! As important as our sustaining donors, are the 39 new Friends of the Oregon Flora Project who participated in the Challenge Drive.

We extend a heartfelt thanks to all who contributed. This challenge money represents a significant portion of our 2007 operating budget, and will fund our staff as we make progress on many fronts. Thank you all!

Thanks

We extend a sincere thanks to the many generous donors who participated in our 2006-2007 Challenge drive: Anonymous, Aislinn Adams, Ed Alverson, John Annear, Catherine Askren, Betty Bahn, Gail Baker, Tom Baldwin, Dan Bates, Connie Battaile, Julie Biddle & Tom Robertson, James & Carol Bluhm, Wilbur & Mary Bluhm, Norma & Henry Booke, Bert G. Brehm, Paula Brooks, Nancy Broshot, Kay Butler, Clair Button, George & Fanny Carroll, Rob Castleberry, Kenton & Henrietta Chambers, Nancy J. Chapman, Al Chase, Elizabeth Churchill, Kim Clark, Melody Clarkson, Glen Cole, James Conklin, Sarah Spear Cooke, Ellen A. Crumb, Terry Daley, Signe & Richard Danler, Robyn Darbyshire, David & Janet Dobak, Heidi Dobson, Nona Donahue, Denis Dooley, Janet Dorow, Barbara Dudman, Jim Duncan & Elaine Plaisance, Penny & Ken Durant, Chuck Edson, Marjorie Ettinger, Gregg Everhart, Jenifer Ferriel.

Greg Freer, Robert Frenkel, Linda Friedman, Lorraine Fritsch, Dave Garcia, Clay Gautier, Valerie Geertson Ray, James & Janice Gerdemann, Edwin Gerow, David Giblin, Marvel & David Gillespie, Sylvia Giustina, Theo Glenn, Louise Godfrey, Peter Goldblatt, DuWayne Goodwin, Andy Gray, Glenn & Barbara Halliday, Sue Hamilton, Jeff Handley, Betty Q. Hansen, Michael Hartman, Tanya Harvey, Ron Hatt, Rebecca Hazen, Don Heller, Gloria Heller, Cliff Heselton, Hillsboro Hematology & Oncology, Kenneth Himes, Pete Holloran, Deven Holmgren, Noel & Patricia Holmgren, Beth Horn, Stephen Horne, Mary Hough, Jill Hubbard & William Griffiths, William Hunt, Jim Johnson, Jesse Jonas & Steven Cantor, Keith Karoly, Tom Kaye, Doramay Keasbey, Tasha King, Karol Kochsmeier, John Koenig, Lane County Master Gardener Assoc., Ron & Kathleen Larson, Rhoda Lewis.

Jennifer Lippert, Aaron & Sara Liston, Kenneth & Robin Lodewick, Rhoda & Glen Love, Dan Luoma, Paul MacMillan, Alex & Lillian Maksymowicz, Sarah Malaby, Elizabeth Marantz, Vernon Marttala, Barbara Massey, Dorothy Mathews, Sara Mauritz, Cheryl McCaffrey, Barbro McCree, Esther Gruber McEvoy, Tom Meehan, Stanley & Margaret Meierhenry, Barbara Mendius, Kathy Merrifield, Greg & Gail Miles, Marilyn Miller, Dan & Pat Montague, Jeanne & Frank Moore, Pat Muir, Barbara Mumblo, Newman's Fish Company of Eugene, Julie & Mark Nichols, Dennis Odion, Bonnie Brunkow Olson, Sandy Ott, Nick Otting, Rob Pabst, Theodore & Laramie Palmer, Edith Parker, Warren Pavlat, Kathy Pendergrass, Marion Peterson, Robert & Marna Porath, Ray & Peg Prag, Richard Prusz, Eleanor Pugh, Carol & Kurt Putnam, Dana Abel & Charles Quinn, Mark Quistad.

Jim Regali, Dan & Laura Relyea, Wes Reynolds, Dell Rhodes, Doug Ripley, Mary Ann Roberts, Georgie Robinett, Mike Robinson, Wayne Rolle, Ben Ross, Robert A. Ross, Bitty Roy, Leonard A. Rydell, Jane Sansregret, Ted & Dorothy Schattenkerk, Shawn Schmelzer, Rudolf Schmid, Rachel Schwindt, Thomas Seddon, Richard Shields, Paul Slichter, Fred Small, Alice C. Smith, James P. Smith, Richard Sommer, Angela Sondenaa, Veva Stansell, Deanna Sterett, Frances Stilwell, Kareen Sturgeon, Norman & Donna Sundberg, Charlie Sundberg & Beth de la Fuente, Ron & Pam Swisher, Jeffrey & Linda Taylor, D. H. Terry, Mary Theis & Chris Van Schaack, Charles Trainer, D. Ann Gahr Trieu, Sarah Uebel, Elaine Urban, Michael VanWinkle, Josephine Von Hippel, Linda Vorobik, David Wagner, Jeff Walker, Luise Walker, Phil Warner, Nancy Weber, Rick Westcott, Kermit Williams, Susan Williams, Margi Willowmoon, Mary Alice Willson, Beatrice Wilson, Marcia Wineteer, Carolyn Wright, L.K. Wright, Walt Yungen, Don Zobel, and Greg Zorn.

Special thanks go to those who provided the matching funds for the Challenge Drive: two anonymous donors, the State NPSO, and the Corvallis and Siskiyou Chapters of the NPSO. Your confidence in and support of the goals of the Oregon Flora Project have been an inspiration!

Gifts were given in memory of the following individuals: Bill Chilcote, from Louise Marquering; Louvera Horn Raymond, from Torrance Raymond and Geraldine R. Custer; Danna Lytjen, from Marty Stein and Freeman Rowe; Scott Sundberg, from Harriett Smith; and Shep Wilson, from Jay & Ann Lunn.

How can I contribute?

Donations to the Oregon Flora Project are a critical part of our operating budget. Your contributions help pay the salaries of our staff and students, as well as all newsletter expenses.

There are two ways to donate to the Oregon Flora Project:

(1) With a check payable to the Oregon State University Foundation, ATTN: Oregon Flora Project.

(2) Through the Friends of the Oregon Flora Project, with a check payable to the Native Plant Society of Oregon, ATTN: OFP.

Mail your check to:
Oregon Flora Project
P.O. Box 402
Corvallis, OR 97331-2902

With your contribution, please let us know if you do *not* wish your name listed in our "Thanks" column, and if you would like to be added to our *Oregon Flora Newsletter* mailing list.

Oregon Flora Project
Dept. of Botany & Plant Pathology
Oregon State University
2082 Cordley Hall
Corvallis, OR 97331-2902

NON-PROFIT ORG
US POSTAGE
PAID
CORVALLIS OR
PERMIT NO 200

************MIXED AADC 97
843 T2 P

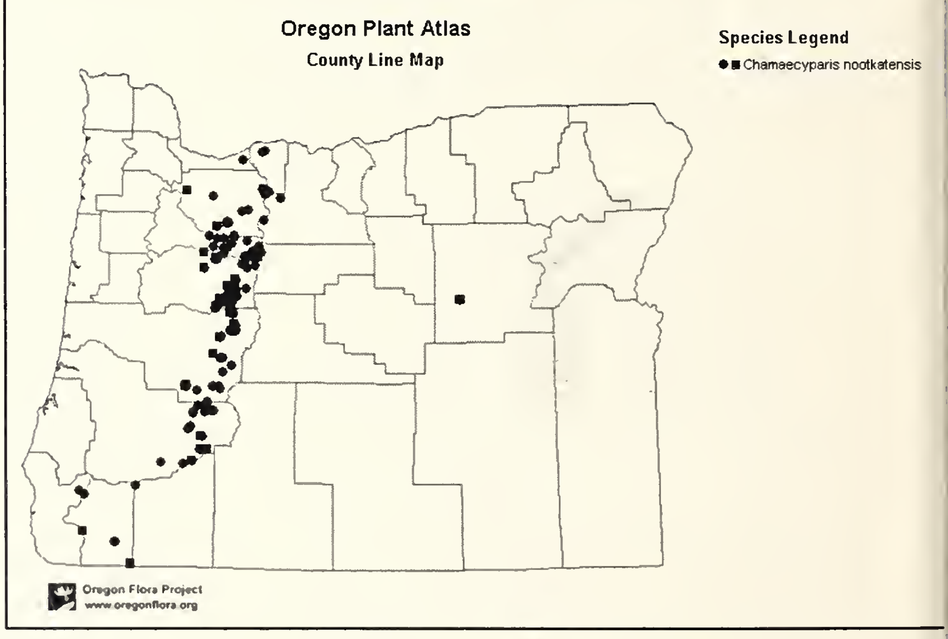
THE NEW YORK BOTANICAL GARDEN
LIBRARY G-607, SERIALS & EXCHANGE
BRONX NY 10458

TIME DATED MAIL

10458+9999-55

Did you know?

- "Corn caraway" is the common name of *Petroselinum segetum*, featured on page one. The word "corn" is Old English for "grain." Our plant probably received this common moniker because it grows in traditionally farmed grain fields.
- The Oregon Plant Atlas lists thirteen different plants that have "corn" in their common names, including corn poppy (*Papaver rhoeas* in the Papaveraceae family) and corn cockle (*Agrostemma githago* in the Caryophyllaceae).
- The Oregon representatives of *Callitropsis bakeri* were once designated as *Cupressus bakeri* subsp. *matthewsii* C. B. Wolf, named in 1948.
- The earliest collection of *Callitropsis bakeri* in Oregon was made by M.W. Gorman, Aug. 24, 1917. He found it on Steve Peak in eastern Josephine County. "Only 127 trees and about 1000 seedlings" were seen, wrote Gorman, "the grove having been burned over 60 or more years ago."



Known sites of Alaska Yellow Cedar, *Callitropsis* (*Chamaecyparis*) *nootkatensis*, in Oregon.

OREGON FLORA *Newsletter*

VOLUME 13, NUMBER 2 OREGON STATE UNIVERSITY JUNE 2007

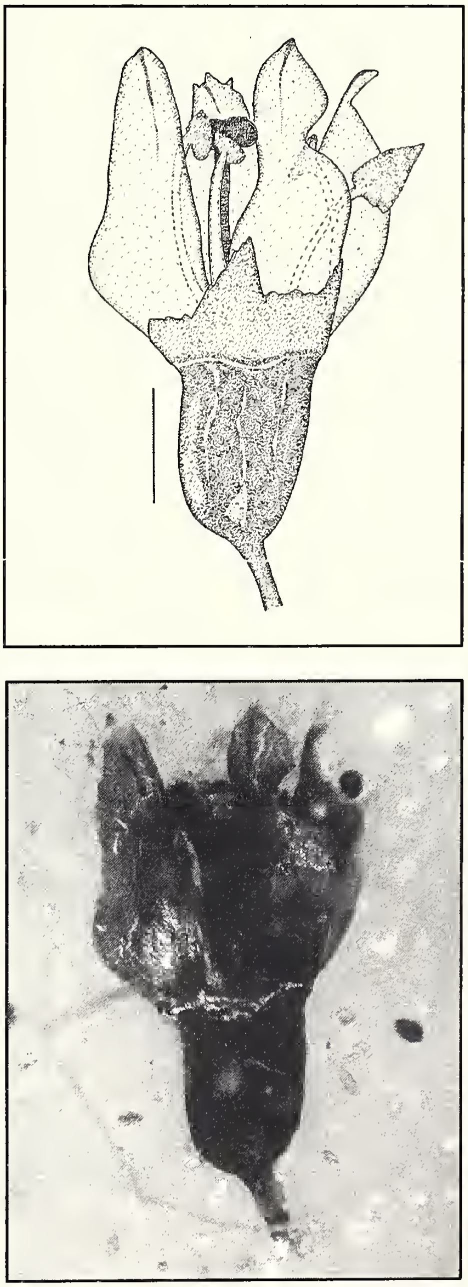
A dogwood ancestor from the Age of Dinosaurs

by Kenton L. Chambers

This article is a change of pace from our usual discussions of modern-day Oregon flora. Instead, it offers a rather mind-bending journey into the ancient past of a familiar group of plants, the dogwoods (Cornaceae). I am fortunate to have been involved in studying and describing a fossil flower, embedded in Burmese amber from the Early Cretaceous Period (Poinar *et al.* 2007). Amber, which is fossilized resin secreted by trees such as pines, araucarias, and arborescent tropical legumes, is well known to contain the remains of organisms of various kinds. The fresh resin acts as a trap for insects, spiders, flowers, seeds, leaves, bits of wood, pollen, and even larger animals like frogs and lizards. Gradually, through the passage of time, the resin hardens to become amber, still containing the perfectly preserved fossil organisms. There is an interesting book by OSU professor George Poinar and his wife Roberta, telling how they reconstructed the life of a long-ago tropical Caribbean forest, based on fossils discovered in amber millions of years old (Poinar & Poinar 1999). Amber is resistant to decay and has lasted far longer than the forests that produced it. Since the days of Rome and before, it has been sought after and mined as a semiprecious stone, to be used for jewelry and other decorative objects.

Because the amber containing our flower has been dated as Upper Albian, ca. 100 to 105 million years before present (mybp), the fossil is a true relic from the Late Mesozoic, the "Age of Dinosaurs." Its most prominent feature, as shown in the photograph and drawing, is its inferior ovary. Because the placement of sepals and petals in such flowers is termed "epigynous," we have named the plant *Eoëpigynia burmensis*, meaning "early epigynous (flower) from Burma." In the scheme of angiosperm classification, an inferior ovary is often associated with evolutionarily advanced families like the Apiaceae (carrot family), Caprifoliaceae (honeysuckle family), Rubiaceae (coffee family), Valerianaceae (valerian family), Orchidaceae (orchid family), and that largest one of all, Asteraceae (sunflower family). However, the feature is known to have evolved independently many times, even in less advanced families such as Nymphaeaceae (water-lily family), Aristolochiaceae (wild ginger family),

See Dogwood ancestor, *page 8*



Eoëpigynia burmensis *drawing and photograph. The anther at the right is covered by a triangular mass of pollen held together by fungal mycelium. Scale bar = 0.34 mm.*

Dogwood ancestor, *continued from front page*

Portulacaceae (portulaca family), Rosaceae (rose family), and Saxifragaceae (saxifrage family). In one recent analysis of angiosperm floral evolution, it was estimated that the change from superior to inferior ovary had occurred at least 64 separate times. Nonetheless, our fossil does document a very early date for at least one example of this morphological floral advancement.

Careful examination of *Eoëpigynia* reveals that it has four similar petals, four equal stamens, a single style with a bilobed stigma, and a short, irregularly fused calyx. The wall of the ovary is thickish and wrinkled, suggesting that it may have formed a berry-like fruit. In our discussion, we tentatively placed the fossil in family Cornaceae (dogwoods), because this floral pattern is so common in modern species of that group. We even found pollen grains resting on the stigma and anthers, which under microscopic study showed three germination pores and paired wall thickenings similar, in general terms, to pollen of modern Cornaceae.

Evolutionary botanists are making great strides towards building a phylogenetic chart for all angiosperms, with DNA sequence comparisons of nuclear and chloroplast genes providing the strongest evidence of relationships (APG I. 1998). As more and more data for hundreds of genera are brought forward, the evolutionary connections of angiosperm families are being extended back in time with increasing confidence. The major group to which Cornaceae belong, informally termed the Euasterids, includes orders Ericales (heaths, phloxes, primroses, etc.), Apiales (umbels, etc.), Dipsacales (honeysuckles, etc.), Asterales (sunflowers, etc.), Gentianales (gentians, dogbanes, milkweeds, etc.), Solanales (nightshades, morning-glories, etc.), and Lamiales (mints, scrophs, plantains, verbenas, broomrapes, etc.). The **pattern** of relationship and divergence of this large group of dicotyledon families is revealed by their DNA, but the **dating** of this pattern depends on two further analytical steps—molecular clock and reference fossils.

Molecular clock refers to estimates of age based on the rate at which genes mutate and evolve. Because these rates vary from one gene to another and may themselves change over time, such estimates always contain an error factor—a spread of confidence limits, in other words. Sophisticated computer programs have been developed to calibrate the molecular clock, according to DNA differences between the families and genera whose genes have been sequenced. From this, dates (in mybp) are estimated for the branching points in the phylogenetic tree of genetic relationship. Reference fossils are fossils of known age that can be placed on one or another of the proposed evolutionary lines—*i.e.* those which are believed to be ancestors of the modern families.

If we are correct that *Eoëpigynia* is ancestral to modern Cornaceae, it will be a significant reference fossil for future molecular clock studies. A review of Euasterid phylogeny by Bremer *et al.* (2004), using six other reference fossils, has estimated the age of the Cornales family cluster (the so-called "crown age") to be ca. 112 mybp. Cornales have a basal position in Euasterid phylogeny, but many of the related orders (mentioned above) also diverged at nearly this same time. That is, the estimated DNA phylogeny for the Euasterids shows rapid branching and diversification in the final 10-20 million years of the Early Cretaceous Period, prior to 100 mybp.

In these studies of fossils and phylogenies, there necessarily are many "ifs" and "maybes." The classification of fossils may be uncertain, and the techniques for estimating molecular clocks need to be further developed. Nonetheless, paleontology still relies on the discovery and description of fossils to calibrate DNA phylogenies, and in this respect, *Eoëpigynia* is a worthwhile contribution to knowledge of angiosperm evolutionary history.

References:

APG I. 1998. An ordinal classification for the families of flowering plants. *Ann. Missouri Bot. Gard.* 85:531-553.

Bremer, K., E. M. Friis and B. Bremer. 2004. Molecular phylogenetic dating of asterid flowering plants shows Early Cretaceous diversification. *Syst. Biol.* 53:4996-505.

Poinar Jr., G. O., K. L. Chambers and R. Buckley. 2007. *Eoëpigynia burmensis* gen. and sp. nov., an Early Cretaceous eudicot flower (Angiospermae) in Burmese amber. *Journal of the Botanical Research Institute of Texas* 1(1):91-96.

Poinar Jr., G.O. and R. Poinar. 1999. *The amber forest.* Princeton University Press, Princeton. 239 pp.

Erythronium oregonum logo and masthead designed by Tanya Harvey.

The Oregon Flora Newsletter is published three times a year by the Oregon Flora Project and the Oregon State University Herbarium. The Editor is Rhoda Love and the Production Assistant is Rena Schlachter.

Oregon Flora Project Coordinator:
Linda Hardison

Checklist Project Leaders:
Kenton Chambers, Richard Halse, Jimmy Kagan, Aaron Liston, Rhoda Love, Robert Meinke, David Wagner, and Peter Zika.

Checklist Advisory Board:
Ed Alverson, Karen Antell, Henrietta Chambers, John Christy, Tom Kaye, Susan Kephart, Frank Lang, Don Mansfield, Kareen Sturgeon, and Barbara Wilson.

Atlas Project Leaders:
Wilbur Bluhm, Robert Frenkel, Clay Gautier, Manuela Huso, Tom Kaye, Jon Kimerling, Aaron Liston, Bruce Newhouse, Charlene Simpson, Dick Straw, Peter Zika, and Don Zobel.

NPSO State Atlas Coordinator:
Wilbur Bluhm

Atlas Project Regional Coordinators:
Bruce Barnes, Lucile Housley, Jerry Igo, Caroline Lindstedt, Andy Robinson, Charlene Simpson, Veva Stansell, and Belinda Vos.

Address correspondence to:
Linda Hardison
Department of Botany & Plant Pathology
Oregon State University, Cordley Hall 2082
Corvallis, OR 97331-2902
E-mail: hardisol@science.oregonstate.edu
(541) 737-4338; FAX (541) 737-3573
http://www.oregonflora.org

Printed on Recycled Paper

The serviceberries: "much perplexity"

by Rhoda Love

Because we are all able to recognize our beautiful spring-blooming rosaceous shrub *Amelanchier alnifolia*, the serviceberry, the reader may wonder at the use of the word "perplexity" in my title. However, here are the 1946 words of Merritt Lyndon Fernald, then Director of The Gray Herbarium at Harvard: "No genus in North America, except of course *Rubus* and *Crataegus*, has offered so much [taxonomic] perplexity and has such contradictory treatment as *Amelanchier*."

Before we dig deeper into the *Amelanchier* problem, I might mention that there is a plethora of common names for these handsome shrubs. In various parts of the U.S. they are known as shadbush, serviceberry, juneberry, Saskatoon, shadblow, shadwood, sugarplum, and wildplum. The word "serviceberry" is said to be a corruption of "sorbus berry"; "Saskatoon" comes from a Cree Indian word "misaskwatomin"; and "shadbush" arose because the serviceberry often blooms at the time of the shadfish runs in U.S. rivers. (Incidentally, there are also *Amelanchier* species in Europe, East Asia, and North Africa as well as North America.)

M. L. Fernald used the word "perplexity" to describe the state of *Amelanchier* taxonomy sixty years ago. I cannot speak with authority about eastern species, but here in the West, Abrams (1944) recognized seven species for the Pacific states; Peck (1961) recognized four species for Oregon; and Hitchcock (1961) recognized two species for the Pacific Northwest, with five varieties of *Amelanchier alnifolia*. Among just these three authors, the list of names is long: *Amelanchier glabra*, *A. cusickii*, *A. covillei*, *A. florida*, *A. gracilis*, *A. utahensis*, *A. pallida*, *A. florida* var. *florida*, *A. florida* var. *gracilis*, *A. florida* var. *cusickii*, *A. alnifolia* var. *pumila*, *A. alnifolia* var. *humptulipensis*, *A. alnifolia* var. *alnifolia*, *A. alnifolia* var. *semiintegrifolia*, and *A. alnifolia* var. *cusickii*. Happily, all three authors are in agreement that *Amelanchier utahensis* is a good species that differs significantly from other western serviceberries.

Pacific serviceberry, Amelanchier alnifolia *var.* semintegrifolia, *from a meadow near Bigelow Lakes, Josephine County. Photographed June 1994 by Glenn and Barbara Halliday.*

The confusing tangle of serviceberry names must now be dealt with because new floras are presently being written. *Flora of North America* (FNA) is appearing at the rate of two volumes per year, and the Rose Family volume is in the planning stages now. Closer to home, the Oregon Flora Project is about to publish online its Checklist of accepted names for all Oregon taxa, and I have been asked to prepare the treatment for the serviceberries. Since I am far from an expert on the genus, I have turned for help to the authors of the draft FNA treatment of the genus, Chris Campbell, Alison Dibble, C. T. Frye, and Michael Burgess. Campbell *et al.* recognize approximately 20 species of serviceberry in North America north of Mexico. These workers make it clear in their January 2007 draft, that polyploidy, hybridization, and apomixis all play a part in the confusing overlap of characteristics in the genus. (In simplest terms, apomixis results in egg cells that are formed by a failure of meiosis and therefore have the somatic, not the gametic, number of chromosomes. Seeds formed asexually by apomixis grow into adult plants that are genetically identical to the parent.) Serviceberry species are known to hybridize when species come together, and these hybrids may reproduce via apomixis. If hybrids repeatedly reproduce in this way, the swarm of resulting offspring may be mistaken for a distinct species unless genetic analysis is undertaken.

The above sequence of events has been demonstrated in *Amelanchier* in the eastern United States via DNA studies carried out by Campbell *et al.*; however our western species have not yet been studied at the molecular level. How then am I to decide which taxa of serviceberries to recognize for Oregon? Chris Campbell and his co-authors of the draft FNA treatment agree with the Jepson Manual and our earlier authors that *Amelanchier utahensis* is a good species and represents the low-growing, hairy-leaved, small-flowered serviceberry found occasionally in drier parts of southern and eastern Oregon.

This leaves the more typical serviceberries with which we are familiar in the Willamette Valley, the Cascades, the Columbia Gorge, the Blue Mountains, southwestern Oregon, and widely scattered in mesic locations in many eastern Oregon counties. One solution might be to call all these *Amelanchier alnifolia*. But after some correspondence with Chris Campbell, I have decided to follow part of the Hitchcock treatment and recognize three varieties of *Amelanchier alnifolia*: var. *alnifolia* from the east Cascades foothills to the Great Plains; var. *pumila*, relatively rare in Oregon but reported from several southern counties; and var. *semiintegrifolia*, the

See Serviceberries, *bottom of page 10*

Hooray for our OFP Volunteers!

by Linda Hardison

The Oregon Flora Project could not exist without the help of many hard-working volunteers. We rely on individuals of all backgrounds and skills to share their expertise, and we are immensely grateful for their contributions. This article salutes one such hard-working volunteer, Charlene Simpson of Eugene. She has devoted significant time through the years in helping the OFP complete its Vascular Plant Checklist, which will be made public in early 2008. Charlene's work for us has been a natural extension of her long-time interests. In 1993 she and other Emerald Chapter Native Plant Society of Oregon members envisioned a plant checklist for Lane County. Charlene convened a nine-member Lane County Checklist Group, and has overseen the development of their work into a published list. Early in the project, she found a willing collaborator in Scott Sundberg, then Director of the OFP. The Lane County Checklist Group published their annotated list in 2002. [To purchase a copy of the Checklist, see Editor's Note.]

The Oregon Flora Project's creation of a synonymized statewide Checklist for the vascular plants of Oregon is, as it was for the Lane County Checklist Group, an undertaking that has demanded accuracy and a broad focus. Adding to the challenge is the fact that the field of plant taxonomy is dynamic; new research can result in realignment of a plant's relationship to others in a species, genus, or even family, coupled with subsequent changes to its scientific name. The goal of the Oregon Vascular Plant Checklist is to provide names and synonyms for Oregon's vascular plants that take into account the most recent taxonomic research.

One key reference whose taxonomy we track is the *Flora of North America North of Mexico* (1993+, Oxford University Press, New York and Oxford). Work on this 30-volume set has been under way in its current form since 1993, with volumes appearing as work is completed. Charlene has taken on the significant task of comparing the currently accepted Oregon Flora Checklist names and synonyms with those in *Flora of North America* (FNA). This entails reviewing every volume and thousands of pages of text! Her primary effort has been to record how FNA treats each plant they cite as occurring in Oregon. She takes note of whether the FNA accepted name is the same as the Oregon Flora Project's accepted name, or if they consider it a synonym. She also compares spelling, authorities, and common names. Of particular interest to OFP are those taxa that FNA reports from Oregon for which we have no record of occurrence. Charlene notes all such inconsistencies in our Microsoft Access database.

How does a volunteer manage a task of this magnitude? Oregon Flora Project database manager Katie Mitchell designed an input form to receive the information gathered by Charlene. Charlene's home computer is equipped with the Access software and the Checklist database, and new data are transferred via CDs or email. She notes that an essential component of her work is the table of OFP acronyms. These taxon-specific codes are necessary for tracking plant names through all the OFP files. Since 2003, Charlene has reviewed 12 published volumes of FNA. Five volumes covering the Asteraceae (sunflower family) and the Poaceae (grass family) have been published in the past two years, and, as we know, these families have significant representation in Oregon. Charlene's timely review of these volumes has more than kept pace with the approaching completion of our Oregon Checklist.

Charlene's OFP research is in addition to her part-time employment at the University of Oregon Office of Student Financial Aid and Scholarships. She reports that she loves the Flora Project volunteer work because she learns so much. She has not only deepened her knowledge of the plants of Oregon, but also has gained an insider's knowledge about the Oregon Flora Project's process in developing our soon-to-be-published, large-scale, synonymized checklist.

Editor's Note: To order a copy of *Vascular Plants of Lane County Oregon* by Simpson *et al.* send $15 per copy to Lane Checklist, Emerald Chapter NPSO, PO Box 902, Eugene, OR 97440-0902.

Photo by Rhoda Love

Charlene at the 2004 Glide Wildflower Show.

Serviceberries, *continued from page 9*

well- known form found west of the Cascades.

Dr. Campbell has made the argument to me that Hitchcock's variety *A. alnifolia* var. *cusickii*, with the largest flowers of all our Oregon serviceberries, should be recognized as a separate species, *A. cusickii,* because according to his research, it has a different blooming time than varieties of *A. alnifolia* and thus does not exchange genes with that species. However, the overlap of key morphological traits between *A. cusickii* and *A. alnifolia* probably means that, for certain plants in eastern Oregon, it will be arbitrary which species name one chooses to use. For now, until molecular work can be done on our Oregon serviceberries, we will recognize three species in our state. These are *Amelanchier utahensis*, *A. cusickii*, and *A. alnifolia*, with three varieties of the latter: var. *alnifolia*, var. *pumila*, and var. *semiintegrifolia*. Some perplexity certainly remains, and *A. cusickii* probably needs closer study, but hopefully Campbell and his co-workers may one day be able to extend their work to the Northwest, and spend some time amid our handsome Oregon serviceberries.

***Author's note:** I thank Kenton Chambers for reading earlier drafts of this article and offering very helpful suggestions.*

Project News: Legislative Support for OFP?

The state of Oregon's tax revenues for the 2005-2007 biennium exceeded its budget projections, meaning that taxpayers will receive a refund under the state's "kicker" law. Flora Project supporters might view this as an opportunity for individuals to determine exactly where their tax dollars are spent. If you receive a refund from the state this December, please consider donating this money to the Oregon Flora Project. OFP staff will keep track of these donations and report to our legislators the number of Oregonians who wish to see state support for creating a state flora—and we will urge them to appropriate funds for this much-needed resource. Your personal letters to legislators on this topic would be very helpful as well.

Our website, *www.oregonflora.org*, has been redesigned, and hopefully many of you have logged on and noticed the changes. Student employee Kit Hoffman has done an excellent job of making the pages more attractive and easy to navigate. We will continue to add features, such as search capabilities for all newsletters, as well as more data, most notably images from the Photo Gallery, as our resources allow.

Input from botanists throughout the region is key to the development of the resources of the Oregon Flora Project. This has been evident as we prepare the Checklist for review by our eighteen Checklist committee members. Thea Cook, one of our database managers, has expertly incorporated the contributions of the many Checklist manuscript authors, researching and resolving the many issues that required clarification. Our reviewers will soon receive the draft Checklist, and once their comments are incorporated this important component of the Flora Project will be available to the public early next year.

In late August, an article about the Oregon Flora Project was published in several Oregon newspapers. Our thanks to Eugene *Register-Guard* reporter Andrea Damewood for her story that informed a wide audience of the work we are doing!

Would you prefer to receive this newsletter electronically?

Beginning with the next issue (October 2007) of the *Oregon Flora Newsletter*, we will offer readers the option of receiving an email notification with a link to the latest OFN issue on our website. This gives you instant access to our publication—with color photographs—as a pdf file. Should you choose to subscribe to our newsletter exclusively online, it will keep more paper out of your mailbox, as well as reduce our printing and mailing expenses.

Those whose email address we have on file will receive a message by September 30th. Simply reply if you would like us to **stop** sending you a paper copy of the *Newsletter* and instead receive only an email notice of each new issue. If you do not hear from us by this date, send us a message at *ofpflora@oregonflora.org* with "Newsletter" in the subject line. To continue receiving a paper copy, no action is necessary.

You can view all issues, past and present, of the Oregon Flora Newsletter at our website, *www.oregonflora.org/newsletter.php*

Thanks

We thank the following for their generous financial support of the Oregon Flora Project:

Norma Alberthal, Sue Allen, Lynda Boyer, Kathy Brewer, Laura Brophy, Gerald & Barbara Carr, Susan Carter, Stanton Cook, Country Vitamins of Corvallis, James Duncan & Elaine Plaisance, Elena Efoli, Michael and Nancy Fahey, Robert Fischer, Lorne Fitts, Albert Gentner, Matt Gordon, Patricia Haggerty, Barbara & Glenn Halliday, Jeanette Hankins, Mrs. James Hanna, Evelyn Hess, Jennifer Kraus, Cynthia Lord, Betty J. Maule, Marilyn Miller, Linda Milne.

Mary Naylor, Gene Newcomb, William Noble, Dennis Odion, Christine Ott-Hopkins, Sherry Pittam, Portland Garden Club, Dave Predeek, Donna Rawson, Barbara Robinson, Ruth & Delbert Shirley, David & Margaret Steward, Leland Steward, Dave & Susan Swanson, Jennifer Travers, Carolyn Ver Linden, Josephine Von Hippel, Jay Walters, Janet Wicka, Faith Wilkins, Harold S. Zald, and the Umpqua Valley Chapter of NPSO.

Gifts were given in memory of Mary Carlson by the Umpqua Valley Chapter of NPSO, and in memory of Bonnie Hall by Jim Hall.

How can I contribute?

Donations to the Oregon Flora Project are a critical part of our operating budget. Your contributions help pay the salaries of our staff and students, as well as all newsletter expenses.

There are two ways to donate to the Oregon Flora Project:

(1) With a check payable to the Oregon State University Foundation, ATTN: Oregon Flora Project.

(2) Through the Friends of the Oregon Flora Project, with a check payable to the Native Plant Society of Oregon, ATTN: OFP.

Mail your check to:
Oregon Flora Project
P.O. Box 402
Corvallis, OR 97331-2902

With your contribution, please let us know if you do *not* wish your name listed in our "Thanks" column, and if you would like to be added to our *Oregon Flora Newsletter* mailing list.

OSU
Oregon State
UNIVERSITY

Oregon Flora Project
Dept. of Botany & Plant Pathology
Oregon State University
2082 Cordley Hall
Corvallis, OR 97331-2902

NON-PROFIT ORG
US POSTAGE
PAID
CORVALLIS OR
PERMIT NO 200

LuESTHER T. MERTZ
LIBRARY
SEP 2 6 2007
NEW YORK
BOTANICAL GARDEN

856 T2 P1

The New York Botanical Garden
Library G-607, Serials & Excha
Bronx NY 10458

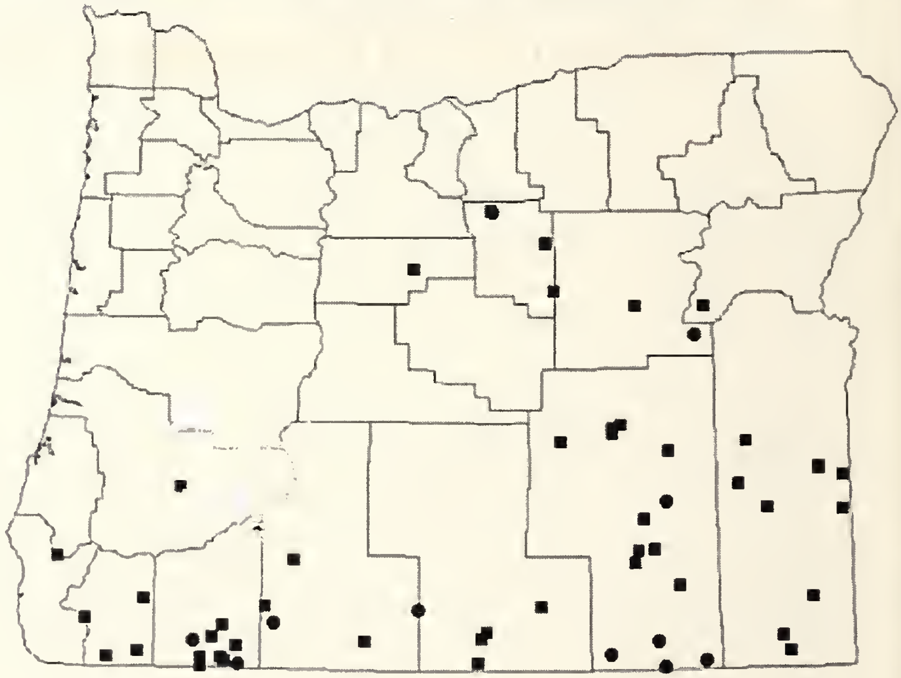
TIME DATED MAIL

Did you know?

- Campbell, Dibble, Frye, and Burgess, in their 2007 draft treatment of *Amelanchier* for *Flora of North America*, recognize approximately 20 species of serviceberry for our continent north of Mexico. The earlier accepted treatment by G. N. Jones (1946) recognized 18 species; while Hitchcock *et al.* in *Vascular Plants of the Pacific Northwest* (1961) suggested the number was closer to 12.

- Hitchcock stated that the genus *Amelanchier* "…is well known for the degree of intergradation between taxa." Campbell addresses a similar problem for the taxonomist, writing, "… many species have not diverged much from one another genetically…"

- Utah serviceberry, *Amelanchier utahensis* (see map), has long been considered genetically distinct from other North American serviceberries. Campbell et al. state that no hybrids between *A. utahensis* and other species are known. Nonetheless, *A. utahensis* is so variable throughout its range in the mountains and deserts of the western U.S. that taxonomists have described and redescribed it under more than two dozen specific and varietal names (Jones 1946).



Known distribution of Utah serviceberry, *Amelanchier utahensis*, in Oregon. The plants are described as low shrubs with tomentose young branches, and leaves that are permanently hairy. The fruit is frequently pubescent, and the flower petals are usually less than 10 mm. in length. Oregon plant distribution maps and collection data can be studied at *www.oregonflora.org*

OREGON FLORA *Newsletter*

VOLUME 13, NUMBER 3 OREGON STATE UNIVERSITY OCTOBER 2007

Jennifer Sackinger, OFP employee

by Linda Hardison

Jennifer Sackinger began working for the Oregon Flora Project in the spring of 2006 in response to an ad seeking help to produce rare plant fact sheets. At the time, she was a post-baccalaureate student at OSU taking a horticulture class.

Jennifer grew up in Ohio, the only girl among four brothers. She attended Ohio State University, earning a degree in geology in 1989. The summer after graduating, she traveled to Oregon to attend a brother's wedding in Grants Pass. Finding Oregon a pleasant place, she decided to stay and look for work.

The forests and landscapes that enticed Jennifer to stay in Oregon also fed her desire to learn more about them. After working in Salem for about half a year, she decided to return to college, this time to study fisheries

See Jennifer Sackinger, page 14

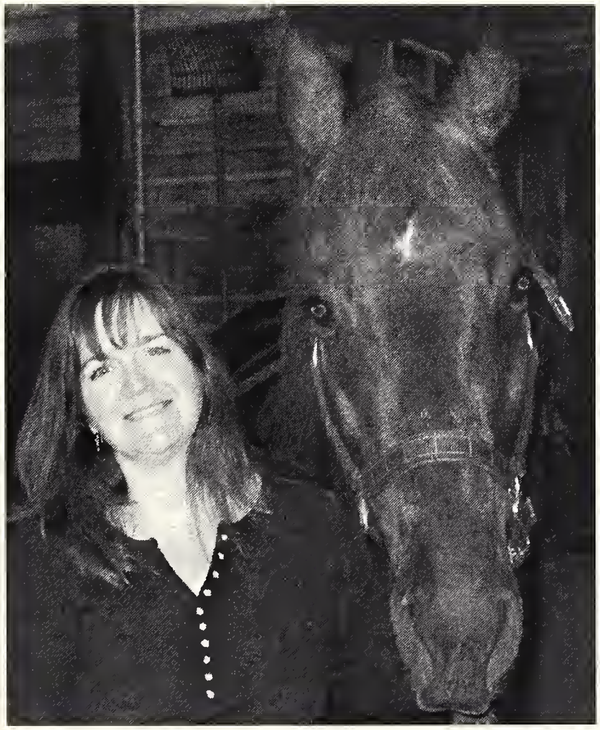


Photo: Doug Sackinger

Jennifer Sackinger with her thoroughbred Nick.

Please give generously to your Oregon Flora Project

by Linda Hardison, Project Coordinator

As the end of the year approaches, we are asking for your generous financial support of the Oregon Flora Project. With approximately one-half of our operating budget derived from individual donations, success of our annual fundraising campaign is crucial for progress toward the publication of our much-anticipated new *Flora of Oregon.*

Over the past year, we have received grant funds to support two important projects. The first will finance development of a morphology database for the Oregon grasses (Poaceae). This will result in a character set for each grass taxon and the ability to identify grasses using our online, multiple-entry key. The second grant is funding the development of databases and data-handling protocols for floristic quality analyses based on existing lists of Michigan wetland species. This project capitalizes on our own data management expertise, and positions us for developing a similar project with Oregon taxa.

Recently submitted grant proposals include OFP collaborations with a University of Oregon lab studying the impact of climate change on endemic plant distributions, and with The Nature Conservancy to provide information about invasive and potentially invasive species. These grant funds are helpful and appreciated, but they are far from adequate to support all the present activities of the Oregon Flora Project.

In addition to the activities above, our accomplishments this year have occurred in two fronts: increasing the ease with which the public can access Oregon Flora Project information, and deepening the taxonomic framework of our data. The online Atlas saw significant improvements in public usefulness as we completed an upload of new information to the Atlas database, resulting in a 20% increase in the number of mappable records to more than 493,000. The Atlas now reflects the nomenclature in our proposed Checklist, incorporating the most recent taxonomic research and introducing a number of changes to plant names.

See Please Give, page 17

Jennifer Sackinger, continued from front page

and wildlife as well as botany. She moved to Corvallis and enrolled in OSU. One of her first classes here was plant taxonomy, taught by Dr. Kenton Chambers. Seeking opportunities to be out in the field, Jennifer took a summer job with the US Forest Service as a stream survey technician. This led to additional forestry-oriented jobs in the Tillamook and Mapleton Ranger Districts. "I enjoy working outdoors," Jennifer says, "and when I was routinely in the field, I developed a greater interest in the local plants and the ecological framework for the work I was doing."

In 1996, Jennifer began work at Dynamac, an environmental consulting firm that holds many contracts with the Environmental Protection Agency facility based in Corvallis. Her first work there was on a riparian monitoring project with sites throughout western Oregon. She later became the logistics coordinator for the Environmental Monitoring Assessment Program. This was a five-year project covering stream and river surveys across twelve states. After working there for nearly a decade, Jennifer became a casualty of company layoffs in 2006.

Jennifer's expertise in organizing and synthesizing data from many sources has been a valuable addition to our Flora Project team. As a part-time employee, she produced forty of the rare plant fact sheets that are part of our online Rare Plant Guide (*www.oregonflora.org/rareplants/index.php*). She then worked on a project compiling species lists for developing wetland assessment tools. Jennifer has also accomplished the formidable task of preparing images for online release through the Oregon Flora Project's Photo Gallery. This includes cropping and editing over 2,000 herbarium specimen images as well as hundreds of field photos!

When not busy contributing her efforts to the Flora Project, Jennifer can often be found at a stable west of campus, riding her thoroughbred horse, Nick. An avowed animal lover, Jennifer has owned and cared for two horses, and shares her home with a dog and cat—as well as her husband Doug. She and Doug also do period-appropriate restoration of their 1919 house.

Working for the Oregon Flora Project has been a good experience, Jennifer says. "I enjoy the people and the work I have been doing, and I appreciate the flexibility in my schedule. Getting to know the plants of our region is interesting to me, and I like being in a learning environment."

Thank you, Jennifer, for being a valued part of the Oregon Flora Project!

Georgia Mason (1910-2007)

by Rhoda Love

We are sad to report that Oregon botanist Georgia Mason died in Eugene-Springfield Oregon on October 8, 2007 at the age of 97.

Ms. Mason played an important role in Oregon botany. She was the Curator of the University of Oregon Herbarium in Eugene from 1969 to 1976. (The Herbarium was later transferred to OSU.) Mason earned a BA degree from Montclair State University in New Jersey in 1941, and an MS from Oregon State University in 1960. She was an expert on the flora of the Wallowa Mountains, and was also interested in wetland plants and weedy invasives of the Willamette Valley. After her retirement from the UO, she continued to live in Eugene and led many educational botany walks in the area. Otherwise she gardened and lived a quiet life with her beloved dogs. She has 4,546 herbarium sheets at the OSU Herbarium (see map, back page). In 1979 she established the Georgia Mason OSU Herbarium Fund with an endowment that supports student employment at the Herbarium in Corvallis.

Georgia Mason published two well-respected books: *Guide to the Plants of the Wallowa Mountains of Northeastern Oregon* (UO Museum of Natural History, 1975), and *Plants of Wet to Moist Habitats in and Around Eugene Oregon* (self-published, 1982).

Erythronium oregonum logo and masthead designed by Tanya Harvey.

The Oregon Flora Newsletter is published three times a year by the Oregon Flora Project and the Oregon State University Herbarium. The Editor is Rhoda Love and the Production Assistant is Rena Schlachter.

Oregon Flora Project Coordinator:
Linda Hardison

Checklist Project Leaders:
Kenton Chambers, Richard Halse, Jimmy Kagan, Aaron Liston, Rhoda Love, Robert Meinke, David Wagner, and Peter Zika.

Checklist Advisory Board:
Ed Alverson, Karen Antell, Henrietta Chambers, John Christy, Tom Kaye, Susan Kephart, Frank Lang, Don Mansfield, Kareen Sturgeon, and Barbara Wilson.

Atlas Project Leaders:
Wilbur Bluhm, Robert Frenkel, Clay Gautier, Manuela Huso, Tom Kaye, Jon Kimerling, Aaron Liston, Bruce Newhouse, Charlene Simpson, Dick Straw, Peter Zika, and Don Zobel.

NPSO State Atlas Coordinator:
Wilbur Bluhm

Atlas Project Regional Coordinators:
Bruce Barnes, Lucile Housley, Jerry Igo, Caroline Lindstedt, Andy Robinson, Charlene Simpson, Veva Stansell, and Belinda Vos.

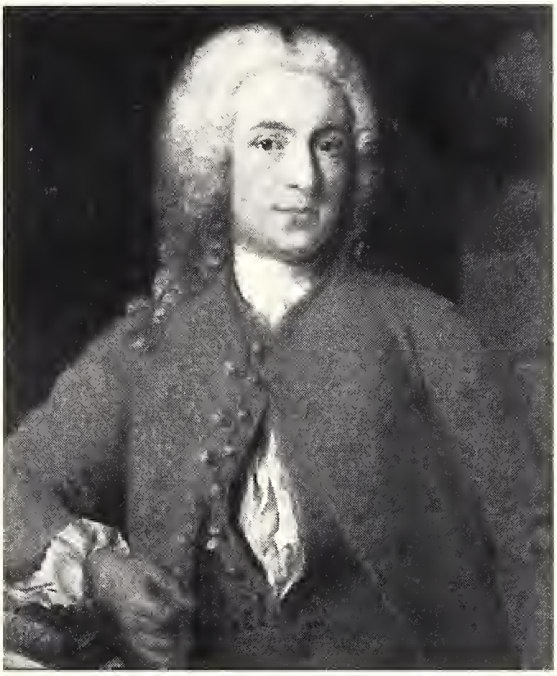
Address correspondence to:
Linda Hardison
Department of Botany & Plant Pathology
Oregon State University, Cordley Hall 2082
Corvallis, OR 97331-2902
E-mail: hardisol@science.oregonstate.edu
(541) 737-4338; FAX (541) 737-3573
http://www.oregonflora.org

Printed on Recycled Paper

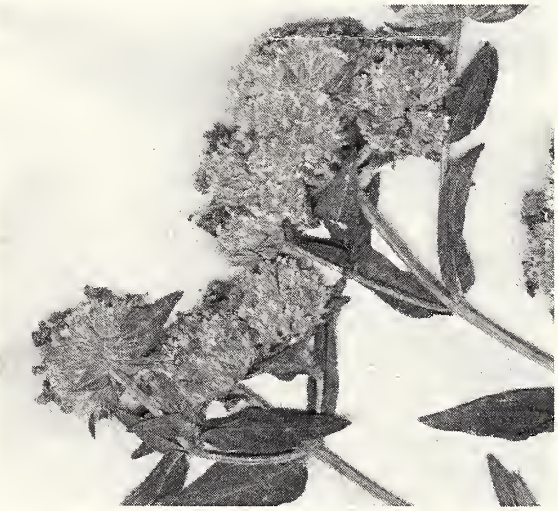
Carl Linnaeus: plant geneticist

by Kenton L. Chambers

Satureja capitulis terminalibus, foliis lanceolatis (Linnaeus 1753). Is that enough to discourage you from reading the rest of this article? I hope not, because I have an interesting story to tell about some early glimmerings of plant genetics by the great taxonomist, Carl Linnaeus. I began with a short Latin description, published by Linnaeus for the plant he named *Satureja virginiana*. Today we call this plant *Pycnanthemum virginianum*, a common herbaceous species of forest edges, roadsides, and abandoned pastures in the eastern United States. *Pycnanthemum*, which is in the Lamiaceae (mint family), is the subject of a taxonomic treatment that my wife, Henrietta, and I are preparing for a future volume of *Flora of North America*. Hence our interest in the early literature on the genus, including the species described by Linnaeus in his monumental work, *Species Plantarum*. The only western species, *P. californicum*, doesn't quite reach Oregon but is widespread at scattered sites southward from the Klamath Range to the mountains of southern California.



Wedding portrait of Carl Linnaeus painted by J. H. Scheffel in 1739



Specimen of Satureja virginiana *(*Pycnanthemum virginianum*) in the Linnean Herbarium, studied by Linnaeus for his description of its nonfunctional anthers. Note that none of the corollas have projecting stamens.*

Linnaeus' brief description, above, translated as "*Satureja* heads terminal, leaves lanceolate," is accurate for *Pycnanthemum virginianum*. However, it is inadequate to distinguish this species from *P. tenuifolium*, another common plant of similar habitats, which is often sympatric (co-occurs) with *P. virginianum*. Although these two are genetically distinct, their similar morphology caused them to be confused by 18th century botanists writing on the flora of the Atlantic Coast region. Unfortunately, taxonomists began to apply Linnaeus' species name "*virginiana*" (which he later changed to "*virginica*") to the species we now call *P. tenuifolium*. It wasn't until 1908 that this error in the use of "*virginiana*" was corrected (Robinson & Fernald 1908).

But the question arises, if the two species were confused with each other by botanists of Linnaeus' time, how can we be sure which was the one he intended to describe as *Satureja virginiana*? Let's look further at his *Species Plantarum* treatment of 1753. After citing five earlier authors' phrase-descriptions, and stating "*Habitat in Virginia*," Linnaeus wrote the following sentence:

Stamina in fundo corollae latent Antheris minimis effoetis, ut fere posset genere proprio tradi.

I should have warned you earlier that there was going to be some Latin in this! But I can translate this for you; it says: "Stamens lie hidden in base of corolla Anthers very small exhausted, such as hardly ever can bequeath proper offspring." Only if we know certain details about the genetics of *P. virginianum* does this unusual statement take on special meaning—hence the title of this article.

What Linnaeus was describing are the abortive, non-functional stamens that often occur in *P. virginianum*, as well as in three other species of *Pycnanthemum* in eastern North America. They have tiny filaments, and their anthers are brown and shrunken, lacking pollen. Hence, as well stated by Linnaeus, they "hardly ever can bequeath proper offspring." In Linnaeus' sexual system of plant classification, the reproductive parts of flowers took on prime importance. Hence male organs that "could not perform their normal function" would instantly have caught his attention and be worth remarking on. The website of the Linnaean Society of London (*http://www.linnean-online.org/*) has available excellent images of all the plants in Linnaeus' private herbarium, and the accompanying figure shows the exact specimen that he must have consulted when writing the note about the "exhausted" anthers. None of the flowers show exserted stamens, as are found in all the sexual species of the genus.

See Linnaeus, page 16

Linnaeus, *continued from page 15*

The final piece to this puzzle was the discovery (Chambers 1961) that *P. virginianum* with abortive anthers can make perfectly normal seeds without pollination, by the process of apomixis. A diploid cell in the vicinity of the female gametophyte, we believe, takes over the function of the egg cell and develops into an embryo spontaneously, without the need for fertilization by a pollen nucleus. Meanwhile, nutritive endosperm tissue forms inside the seed by cell divisions within the gametophyte. The exact details in *Pycnanthemum* have not been worked out cytologically, but the process is well known in other angiosperm genera (an example in *Amelanchier* was described by Rhoda Love in the last *OFN* issue). American plants that Linnaeus was examining when he wrote his 1753 book must have come from the colonies that would later form the 13 original American states, extending from Georgia north to New England. In this region, *P. virginianum* is almost entirely apomictic, lacking functional anthers, whereas in the same area, *P. tenuifolium* mostly has normal, pollen-bearing anthers and reproduces sexually. (Farther west, in Ohio and Tennessee, are found sexual races of *P. virginianum* and apomictic ones of *P. tenuifolium*, but that's another story).

The conclusion, therefore, is that Linnaeus must indeed have intended the apomictic *Pycnanthemum virginianum* when he described his species *Satureja virginiana*. He didn't provide a separate name for the large-anthered, sexual *P. tenuifolium*, although we suspect he had seen specimens of it earlier, for example when he described what he called "*Clinopodium foliis linearibus acuminatis, capitulis terminalibus*" in *Hortus Cliffortianus* (1737). Even the great Linnaeus could make mistakes, and he may have thought that the "linear-leaved" plant he had seen in George Clifford's garden in Holland in 1737 was the same as the "lanceolate-leaved" plant in his hands in Sweden in 1753, with its "small, exhausted stamens." Although he didn't understand the biological significance of such stamens, he deserves credit for calling attention to them. Even more credit, I think, goes to Henrietta Chambers, who in 1961 was the first botanist to understand their meaning for the apomictic breeding system in *Pycnanthemum*.

References

Chambers, H. 1961. A cytotaxonomic study of the genus *Pycnanthemum* (Labiatae). Ph.D. thesis, Yale University, New Haven, CT.

Linnaeus, C. 1737. *Hortus cliffortianus*. Amsterdam, p. 305.

Linnaeus, C. 1753. *Species plantarum*. Laurentii Salvii, Holmiae, p.567.

Robinson, B. L. and M. L. Fernald. 1908. *Gray's new manual of botany. 7th. ed.* American Book Co., New York, pp. 707-8.

Project News

by Linda Hardison

Work on the grasses of Oregon has been a recent focus of the Oregon Flora Project. With funding provided by a grant from the OSU Research Office, staff member Katie Mitchell has been leading the work to create a list of the morphological characters of grasses, and designating each character state for all of Oregon's 403 known grass taxa. This morphology database will be the source of information for our online multiple entry key. Completion of Family Poaceae will result in a unit that can be immediately utilized by the public while the remainder of Oregon's taxa continue to be researched. We thank David Bogler of Missouri Botanical Garden for sharing his initial list of grass characters, and Richard Halse and Rob Kimmich for assistance in refining our list.

As the preparation of the Checklist enters its final stage, we continue to add detail to this aspect of the Flora. For example, an analysis of Oregon's non-native plants has led data manager Thea Cook to assign a specific "exotic status" to each taxon. With categories such as "escaping cultivation," "vegetatively spread," and "ballast species," we hope to better define and track these elements of our flora. With the release of the full Checklist in the coming year, we will include appendices that note which plants have not been recently collected, and those which display narrow distributions. We hope these designations will serve as a catalyst for further study of these taxa. Our work with the ever-developing Checklist makes abundantly clear what a wealth of information we have assembled, and the opportunities for research that will be possible through the use of this new resource.

Several of the Flora Project activities in progress have received significant input from our much-valued volunteers. Gene Newcomb has completed an important project in which he compared the plant names in one of our key references, Hitchcock's *Flora of the Pacific Northwest*, to those currently used by the Flora Project, and entered this information in an accessible research table. Gene has also been cataloging a large collection of plant images from *another* volunteer/donor, Bruce Newhouse of Eugene. The Photo Gallery continues to move closer to its public release with the work of Jeff Cook, who has been developing software that will make available on the Oregon Flora Project website our many photographs of Oregon plants as another "stand alone" feature such as our present Atlas and upcoming Checklist.

Our newsletters, with color images, are posted on our website at *www.oregonflora.org/newsletter.php*. If you would like to receive an email notification of each new issue and **stop** delivery of the paper copy, please send us a message at *ofpflora@oregonflora.org* with "Newsletter" in the subject line.

Please Give, *continued from front page*

Our website, www.oregonflora.org, has undergone a complete renovation, making it more attractive, informative, and easier to navigate. We also launched the full-color Rare Plant Guide, a searchable interface to more than 100 fact sheets on Oregon's rare plants.

Our second area of important progress is within the Oregon Plant Checklist itself. The final document, the work of dozens of botanists over 13 years, is nearly ready to submit to Checklist committee members for review. This compendium of Oregon plants captures the details and rationale of the nomenclatural changes within Oregon taxa. The preparation of the Checklist has also raised issues about how we recognize exotics as well as plants not officially seen or collected in our state for decades. In response, we are preparing additional features and analyses of these topics and will soon share these with the public.

What will your dollars support in the coming year? First and foremost will be the online publication of the annotated Checklist of all plants known to exist in our state with their presently accepted names. Also important will be the release of a searchable Photo Gallery featuring thousands of full-color images of herbarium specimens and plants in the field. The Checklist is the foundation of the Oregon Flora Project, and a published, working version marks a significant achievement from which we can begin the writing of the new *Flora of Oregon*. Our development of the morphology database also supports the projected new *Flora*, as we are able to apply our information both to create an online, multiple entry key as well as provide the data as a resource to authors of floristic treatments.

Another effort your financial support will fund is the creation of a support system for the writing of the *Flora of Oregon* in book form. While our current activities of maintaining and expanding the Atlas and other features must continue, we are also poised to begin the information gathering necessary for writing our *Flora*. The creation of a financially sound infrastructure that will successfully support this endeavor is the surest way to guarantee success of this long-anticipated undertaking.

How can you help? There are two ways in which we challenge you to demonstrate your support of the Oregon Flora Project: 1) Oregon citizens will receive a "kicker" from the surplus tax revenue generated in the last biennium. We challenge you to donate your kicker check to the OFP as a demonstration of your belief that state funds should support this statewide project. 2) Assign a dollar amount to the value you place on Oregon's botanical resources, its biodiversity, and its unique ecosystems. Donate this amount to the only organization that is providing scientifically based information about Oregon plants to the public, to policy makers, and to government agencies—our Oregon Flora Project!

Please give generously—our fundraising campaign runs from November through January 2008. This provides an opportunity to contribute your tax-deductible gifts in two tax years. Checks can be made out to the Native Plant Society of Oregon *or* to the OSU Foundation; please include "Oregon Flora Project" on the memo line. In both cases, all funds go to the OFP. Mail them to:

Friends of the Oregon Flora Project
P.O. Box 402
Corvallis, OR 97339-0402

Thank you in advance for your generous support.

Thanks

We thank the following for their recent generous financial support of the Oregon Flora Project: Connie Battaile, Gretchen & Denis Carnaby, Kenton & Henrietta Chambers, Glen Cole, Anne Corey, Geraldine Custer, Glenn & Barbara Halliday, Diana Holland, Mary Hough, Rebecca Huot, Morris & Margaret Johnson, Jennifer Lippert, Barbara Massey, Cheryl McCaffrey, Marilyn Miller, Nick Otting, Charlie Quinn, Charles Trainer, Elaine Urban, Mary Alice Willson, Gordon Wogan, and L.K. Wright. We also thank Thea and Jeff Cook for their recent donation of computer equipment, which provided a much-needed technological upgrade.

Gifts were given in memory of Mary Carlson by Jeanne & Frank Moore; in memory of Joan Fosback by Jeanne & Frank Moore and the Umpqua Valley Chapter of NPSO; in memory of Georgia Mason by Rhoda & Glen Love and David Wagner; and in memory of Scott Sundberg by Barry & Aliki Anderson, Richard & Isabelle Littman, Linda Rain, and Norman & Donna Sundberg.

How can I contribute?

Donations to the Oregon Flora Project are a critical part of our operating budget. Your contributions help pay the salaries of our staff and students, as well as all newsletter expenses.

There are two ways to donate to the Oregon Flora Project:

(1) Through the Friends of the Oregon Flora Project, with a check payable to the Native Plant Society of Oregon, ATTN: OFP *(preferred method)*

(2) With a check payable to the Oregon State University Foundation, ATTN: Oregon Flora Project.

Mail your check to:
Oregon Flora Project
P.O. Box 402
Corvallis, OR 97331-2902

With your contribution, please let us know if you do *not* wish your name listed in our "Thanks" column, and if you would like to be added to our *Oregon Flora Newsletter* electronic or paper mailing list.

Oregon Flora Project
Dept. of Botany & Plant Pathology
Oregon State University
2082 Cordley Hall
Corvallis, OR 97331-2902

NON-PROFIT ORG
US POSTAGE
PAID
CORVALLIS OR
PERMIT NO 200

LuESTHER T. MERTZ
LIBRARY
DEC 05 2007
NEW YORK
BOTANICAL GARDEN

*************MIXED AADC 970
724 T2 P1

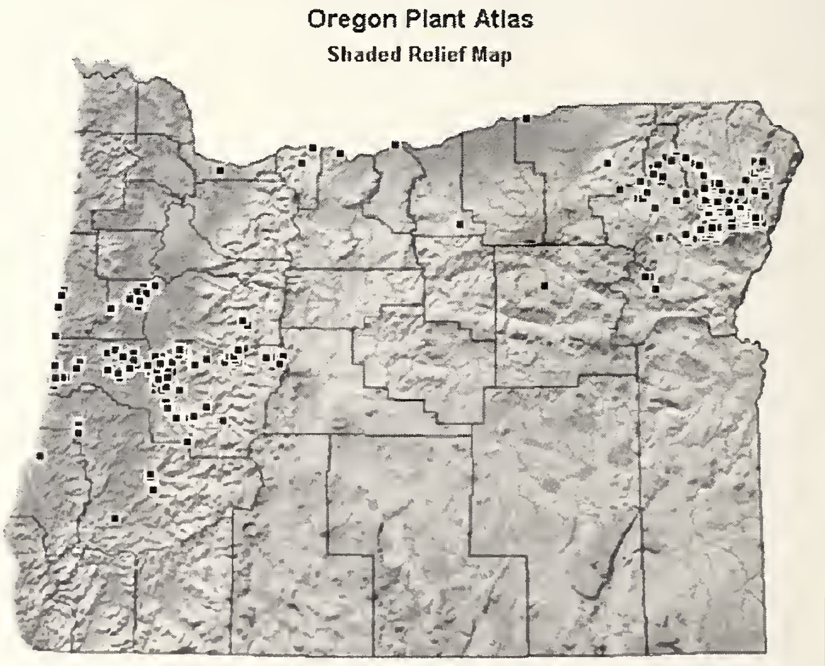
THE NEW YORK BOTANICAL GARDEN
LIBRARY G-607, SERIALS & EXCHA
BRONX NY 10458

TIME DATED MAIL

Did you know?

- The work of the Oregon Flora Project benefits a great many individuals, businesses, and institutions, and is accomplished on a very constrained budget.
- We have employed 111 undergraduate students in the 13 years of the project.
- We have evaluated 1,677 possible error reports provided by Oregon Plant Atlas users; this has resulted in changes to 1,253 records.
- Of the almost 1,200 individuals and small societies on our Friends list, 68% have donated to the OFP. From these, more than half have made more than one donation, and almost 100 have been regular donors.

You can help with your financial support of the OFP—see page 17 for details.



The OSU Herbarium collections of Georgia Mason, reflecting her intense research in the Wallowas and the Willamette Valley. Ms. Mason collected over 4,500 specimens spanning 22 years from 1959-1981. From the Oregon Plant Atlas (*www.oregonflora.org/atlas.php*).